

KEY SWITCH

BACKGROUND OF THE INVENTION

This invention relates to a key switch adapted to be used with a keyboard fitted to a computer, cash register, motorized typewriter and other electronic appliances.

The known key switch used with the above-mentioned various electronic appliances comprises the so-called mechanical type wherein a pair of fixed contacts are electrically connected together or shut off from each other by the selective operation of a movable contact unit, and the so-called capacitive type whose operation is controlled by the magnitude of capacitance stored between a pair of electrodes.

Obviously, these mechanical key switch and capacitive key switch have both merits and demerits. A keyboard fitted with either type of key switch has the drawbacks that its manufacture is time consuming, resulting in a high cost. For instance, a keyboard fitted with a mechanical key switch is handicapped by the fact that due to the specific construction of the mechanical switch, the keyboard substrate must be provided with a diode for each key switch. Fitting numerous diodes to the surface of the keyboard substrate consumes a great deal of time.

In contrast, a keyboard equipped with a capacitive key switch also has the defects that, when the keyboard substrate is provided with print wiring only on one side, the substrate should be provided with a jumper for each key switch in view of the specific structure of the capacitive key switch itself. In this case, too, the manufacture of a keyboard takes as long time as that of the type fitted with a mechanical key switch.

Referring to a keyboard provided with a capacitive key switch, it may be possible to omit the fitting of the above-mentioned jumper to the keyboard substrate, if print wiring is formed on both sides of the keyboard substrate. In such case, however, both sides of the keyboard substrate itself became noticeably expensive. Namely, both sides of the keyboard substrate have to be provided with numerous penetrating holes for the electrical connection of print wirings formed on both sides of the keyboard substrate. The machining of these penetrating holes also increases the cost of the keyboard substrate.

Consequently, regardless of which type of key switch may be used, the manufacture of the whole keyboard consumes a tremendously long time and presents difficulties in ensuring cost reduction.

SUMMARY OF THE INVENTION

It is accordingly the object of this invention to provide a key switch which can be constructed easily, thereby noticeably reducing time and cost in the manufacture of a whole keyboard.

To attain the above-mentioned object, this invention provides a key switch interposed between an electric pulse generator and a receiving circuit. Said key switch comprises:

a substrate prepared from dielectric materials and having first and second surfaces;

a first electrode mounted on the first surface of the substrate to be electrically connected to said electric pulse generator;

a second electrode provided on the second surface of said substrate opposite to said first surface and constitut-

ing a capacitor pulsatively storing a static capacity in cooperation with said first electrode and substrate;

a first fixed contact provided on one surface of the substrate in electric contact with one electrode positioned on one surface;

a second fixed contact formed in one surface of the substrate close to the first fixed contact and in electric connection to the signal reception circuit; and

changeover means for effecting electrical connection and shutoff between the first and second fixed contacts.

The key switch of this invention offers the advantages that electrical connection and shutoff between the first and second fixed contact are effected by means of a movable contact; static capacity pulsatively stored between the first and second electrodes can flow to the signal reception circuit through the first and second fixed contacts and the movable contact, thereby effecting a switching function; the operation principle of the subject key switch dispenses with the provision of any extra element for each key switch; and it is possible to noticeably reduce the number of parts to be fitted to the substrate surface, reduce the steps of manufacturing the whole keyboard and cut its cost.

The present invention offers further advantages that since the first and second electrodes constitute a capacitor in cooperation with the substrate made from dielectric material, electric connection between the first and second surface of the substrate can be effected; the substrate of a keyboard using key switches embodying this invention can be used as a 2-plane type substrate without being provided with penetrating holes; the first and second electrodes and the first and second fixed contacts can be printed on both surface of the substrate together with wires; though both first and second surfaces of the substrate of the keyboard fitted with the key switches embodying this invention are used, the substrate can be produced inexpensively, thereby reducing the manufacturing cost of the entire keyboard itself; since the first and second fixed contacts are connected by the movable contact from the above-mentioned operation principle, and since the reception circuit is continuously supplied with pulsative signals, a single operation of a key switch embodying this invention ensures a continuous switching input without software control.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of an entire keyboard;

FIG. 2 is a sectional view of key switches according to a first embodiment of this invention which are used with a keyboard of FIG. 1;

FIG. 3 presents exploded perspective view of the key switch of FIG. 2;

FIG. 4 is a sectional view of a guide housing assembled with a lift stem;

FIG. 5 is a sectional view on line V—V of FIG. 4; and

FIGS. 6 to 11 are plan views of respective embodiments illustrating different shapes of the first and second fixed contacts.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The keyboard of FIG. 1 according to the first embodiment of this invention provided with numerous key switches 12 is used with a computer and motorized typewriter.

The construction of respective key switches 12 are best shown in FIGS. 2 to 5. FIG. 2 indicates substrate